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ABSTRACT

Research-based technologies for solving problems currently exist but are not being widely implemented. Although user variables, program effectiveness, and political considerations have been documented as correlates of implementation, general non-implementation of the technology still exists, due to a lack of methods. A technology of dissemination needs to be developed to acquaint practitioners, decision makers, and the general public with existing programs. A technology of knowledge diffusion and utilization is needed for research-based innovation, psychological technology, educational technology, consultant advice, and professional advice. With an effective technology of knowledge diffusion and utilization, society would have tools to enable it to improve itself in a systematic fashion. (Author/BL)

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Steps Toward A Technology for the Diffusion of Innovations

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Steps Toward a Technology for the Diffusion of Innovations

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Behavioral and social scientists try to advance our knowledge of the fundamental processes of human behavior, and to improve the techniques we have for dealing with social problems. When techniques for dealing with social problems are successfully developed, society should put those techniques into practice.

Using the methods of applied behavior analysis, behavioral researchers have developed some workable technological solutions for a number of social problems, solutions that seem to deal with those problems better and often at less cost than methods currently in use. Unfortunately, very few of these technological solutions are actually being used by society. One author recently summed up the typical situation by saying, "The field of education is littered with the corpses of proven innovations. Solving a problem is not usually enough to ensure that the solution will be widely implemented" (Embry, in press).

A few behavioral solutions have been widely implemented. I (Stolz, 1981) have published a case study of three instances in which government, at some level, adopted as policy a behavioral solution to a social problem. One was an enforcement system for getting citizens to package their trash properly; another, a system for enabling the unemployed to help themselves find jobs, and the third, a community-based treatment facility for delinquent youth.

This last, Achievement Place, is one of the most widely used technological developments in the field of applied behavior analysis: Currently, approximately 170 sites in the U.S. are using this method (Kirigin, Braukmann, Atwater, & Wolf, 1982). Another widely used behavioral model is the BAM project, developed by Liberman and his associates. But such widespread use of behavioral technology is rare. The development of techniques for solving social problems--even of technology ready for immediate application--is very far ahead of the development of techniques for getting those solutions used by society.

Experimental Research on Implementation

A major reason for non-implementation is that implementation is not studied experimentally. Typically, after researchers have demonstrated the effectiveness of an innovative solution to a social problem, they move on to another research question like the first. Very little research has attempted to develop methods for implementing innovations so that use of the innovations will spread, once the research project is over. Probably the most well known exception to that generalization is the classic study by Fairweather, Sanders, and Tornatzky (1974), who compared several techniques designed to get hospitals to adopt a particular post-hospitalization living program for recovering mental patients. Their systematic nationwide study attempted an experimental analysis of some of the variables thought to be functional in getting new procedures used for the care of former patients.

The Fairweather et al. (1974) study is one of few exceptions to the general custom. Usually, the topic of implementation is simply ignored. Researchers rarely study what affects a program's implementation, and rarely publish details that would enable a subsequent analysis of the variables

that affected their program's implementation or lack of implementation, once the research is completed. Rather, researchers measure the impact of an innovative intervention, and do not evaluate the process by which the intervention comes to be used. As a result, although a body of knowledge is developing about what kinds of behavioral interventions can be successful, this literature is not contributing to building a related body of knowledge on how to get successful procedures used (Stolz, 1981; Stolz, in press a).

Correlational Research Describing Users of Models

Much of the literature on the diffusion and use of innovations consists of opinions. A large portion consists of observations of experiences, including descriptions of what, in the authors' experience, seemed to be key variables in the process of getting their innovations used.

There are, of course, many contributions from those who have scientifically observed change in process (Salasin & Davis, 1977). However, most of these only report correlations: Whether a given innovation is used is related to variables such as the personal characteristics of the decision maker--age, education, or social status (see Roessner, 1980)--or structural characteristics of the organization using the model--its size (Nickel & Davidson, 1982), degree of centralization, or complexity (Gottschalk & Schmitt, 1982).

One review of this literature (Roessner, 1980) reports that for many variables, the correlation in about two-thirds of the published studies investigating some generalization or conclusion support it, and about one-third do not. In an even more extreme example cited in the same review (Roessner, 1980), out of 288 studies, 33% showed that those who are among the first to use innovations are older persons, 19% that they are younger, and

48% that there is no relationship between age and the use of innovations. Overall, tbe consensus in the field is that correlational research on this topic has not yet found the key predictors (Stolz, 1981; Blakely, 1982).

Even reliable correlations between the use of innovations and characteristics of the decision maker or the agency will not produce a technology, however, because, so far, neither class of variables has been manipulable. That is, if data were to reveal that agency staff of a particular educational background were more likely than other staff to use innovative interventions, we could not design a program to take advantage of this and get innovations used. My imaginary data might give us a guide as to which individuals to work with first, but once the individual was identified, these data would not lead to a workable technology. Similarly, if a predictor variable turned out to be agencies' organizational complexity, such that more complex agencies were more likely to use innovations (Gottschalk & Schmitt, 1982), no practical technology for promoting the use of innovations could be developed, because to make an agency more amenable to innovating, the technology would have to increase the agency's level of complexity.

The central problem with correlations showing what variables relate to knowledge diffusion and utilization is that the variables identified tend to be structural or topographic, rather than functional or analytic. A correlation showing a relationship between size of agency and use of innovations does not tell us why agencies' size is related to their use or non-use of innovations. Although correlational studies ideally should be followed with analytic studies attempting to find the underlying functional variables, such analytic studies are rarely, if ever, done. Research

directed at a functional analysis would be a study in which control of the decision to use an innovative method of service delivery was demonstrated, or at least brought under enough control for plausibility (Baer, Wolf, & Risley, 1968).

The absence of a technology for disseminating information about new procedures, and the virtual absence of research attempting to develop such a technology, contrasts sharply with the abundance of technology available for dealing with social problems, and with the abundance of active research on developing and refining solutions to social problems. Only a handful of scientists are currently addressing the problem of how to get innovative solutions implemented by society, once they are developed.

Good Data Are Not Enough

One of the factors generally thought to be important in getting innovations used is having data on the innovation's effectiveness. Is clear evidence of effectiveness, perhaps cleverly presented all that is needed?

Some social scientists typically operate on the premise that "once knowledge and truth are assembled, . . . transfer of knowledge . . . will take care of itself" (Cowen, Davidson, & Gesten, 1980, p. 36). Many researchers have told me that they expected that simply publishing good data would get their procedures used. And, conversely, if the research was less than top quality or showed only a weak effect, they expected that their procedures would not be used. Certainly these opinions seem reasonable and logical.

However, as one group of researchers (Cowen et al., 1980) despairingly concluded, "life is neither so simple nor so just" (p. 36); rather, there is, in their words, a "serious gap" (p. 37) between data and

their use. The empirical results are not consistent on the importance of having good data. Some studies show that research quality is an important determinant of later use (Baer, Johnson, & Merrow, 1977; Weiss & Bucuvalas, 1977), others that quality is irrelevant (Patton, Grimes, Guthrie, Brennan, French, & Blyth, 1977; Useem & DiMaggio, 1978). At best, however, solid data on the effectiveness of an innovation are not a sufficient explanation for its use (cf. Sherman, 1981; Stolz, in press b). Indeed, because some good data lead to knowledge diffusion and knowledge utilization, and some do not, and because some innovations poorly supported by evaluation results--or with no evaluation at all--are used even so, good data must be neither necessary nor sufficient for getting innovative models used. Thus, the search for the key variables in the diffusion and utilization of knowledge will have to look beyond the quality of the data on the effectiveness of the innovation.

In some people's opinion, innovative methods of service delivery are used, not because of the elegance of the supporting data, but because of economic, social, and political forces (Peters, 1980). Some authors, seeing this apparent relationship, urge psychologists to become political advocates--to work through the political system to sell technological innovations such as innovative service delivery systems as an essential component of public policy (Liberman, 1980; Peterson, 1981; Skinner, 1981). However, the same questions remain: How are these changes in public policy to be brought about? How is political advocacy done? How can we get decision makers to use new ideas?

Need for a Technology of Dissemination

In my opinion, what is needed is a technology to disseminate innovative service systems to practitioners, decision makers, and other key members of the public. That will require research on the dissemination process, such as that done by the other speakers in this symposium. Despite the availability of procedures for developing an effective and practical technology of human behavior, we do not yet have a comparable effective and practical way to design the environment so that people learn about the technology and use it.

To train a child to use different words with different audiences, we design the environment with an experimentally developed program and reinforce the child's correct behavior when it occurs. Similarly, we need to find how to design the environment for dissemination and utilization; we need to know how to modify those settings, the programming of those stimuli, and the consequences for that behavior. If there were a technology of how to get scientific advances used, the widespread use of the Achievement Place program, the BAM approach, and Fairweather Lodges would not be exceptions. Rather, once service delivery systems for dealing with a social problem were developed, the technology for disseminating information about those systems could then be used, so that society would learn about and use them.

Where can we begin to find a technology of knowledge diffusion and utilization? What is needed to begin the development of such a technology is one or more truly key variables that are manipulable and that will result in diffusion and utilization. In the absence of information about such

strong variables, the literature in the area of the diffusion of innovations contains numerous lists of possibly effective variables, but each of them appears to be weak (Roessner, 1980; Stolz, 1981).

In areas dealt with by applied behavior analysis, in contrast, the literature is organized by its reference to a few strong variables, particularly reinforcement and stimulus control. With these few theoretical principles, the apparent complexity of behavior dissolves (in most cases). In medicine, likewise, researchers' experience has been that until the cause of a disease was discovered, the disease was thought to be extremely complex, affected by a variety of environmental influences, and not subject to simple control techniques. Once a single causative agent is located, however, the apparent complexity dissolves, and control of the causative agent results in control of the disease (Thomas, 1979).

For the diffusion of technological innovations, the causative agent, the strong variable, is yet to be located. Presumably, once such an agent is found, the expected reduction of complexity will result. Until such an agent or agents are identified, until research reveals the variable or variables most influential, the only recourse for those interested in promoting dissemination is to focus on those variables that (at a minimum) have been shown to increase the probability that an innovation will be adopted.

Problems in getting clients to use particular procedures, that is, learn particular behavior, are seen by applied behavior analysts as problems in behavior change, for which the technology of behavior modification is a recommended solution. Problems in dissemination, in contrast, are typically

seen, even by applied behavior analysts, as problems in knowledge diffusion and the adoption of technology, as though these latter were completely different issues from the former.

However, problems in dissemination can be comfortably conceptualized as problems in behavior change, for using a new technology calls only for changes in what people do. Furthermore, in my view, problems in behavior change can always be conceptualized at least as mini-problems in dissemination, in that the desired goal is to have the clients become aware of the procedures needed to change the target behavior (or, in other words, knowledge diffusion), and to have them use these procedures to acquire the behavior (or, in other words, use the technology).

I recommend that our next research on dissemination focus on variables and techniques shown in other contexts to be effective for changing behavior (cf. Kegeles, Lund, & Weisenberg, 1978; Stolz, in press c). Once their effectiveness as techniques for getting innovations used has been determined, then their generality can be assessed. After empirically based techniques are available, they should show us how to get <u>them</u> used.

Summary and Conclusions

In this talk, I have dealt with the problem that research-based technologies for solving social problems exist and yet are not being widely used. To solve that problem, a new technology needs to be developed that would enable control of the processes of knowledge diffusion and knowledge utilization.

A technology of knowledge diffusion and utilization is needed for

- any research-based innovation, so that the innovation is included in government and industry decision making;
- any psychological technology, so that the technology is used by therapists;
- any educational technology, so that the technology is used by teachers;
- any advice from consultants, so that the information they provide is used by the agency, industry, or government department they are advising; and
- any advice from professionals, so that the information they provide is used by citizens--this could include complying with a physician's instructions, learning techniques of better parenting, improving the conservation of energy, stopping littering, or wearing seat belts.

If there were an effective technology of knowledge diffusion and knowledge utilization, society would have tools to enable it to improve itself in a systematic fashion. Thus, knowledge diffusion and knowledge utilization are socially important applied problems, as well as exciting basic research issues.

References

Baer, D. M. The nature of intervention research. In R. L. Schiefelbusch & D. D. Bricker (Eds.), Early language: Acquisition and intervention. Baltimore, MD: University Park Press, 1981.

Baer, W. S., Johnson, L. L., & Merrow, E. W. Government-sponsored demonstrations of new technologies. Science. 1977, 196, 950-957.

Blakely, C. Organizational innovations: What have we learned? In C. H. Blakely (Chair), Adoption, implementation, and routinization of organizational innovations. Symposium conducted at the meeting of the American Psychological Association, Washington, D.C., August 1982.

Cowen, E. L., Davidson, E. R., & Gesten, E. L. Program dissemination and the modification of delivery practices in school mental health. Professional Psychology, 1980, 11, 36-47.

Embry, D. D. The Safe-Playing Kit: A standardized intervention package. In S. Paine, T. Bellamy, & B. Wilcox (Eds.), Human services that work: From innovation to standard practice. Baltimore, MD: Paul H. Brookes, in press.

Fairweather, G. W., Sanders, D. H., & Tornatzky, L. G. Creating change in mental health organizations. NY: Pergamon, 1974.

Gottschalk, R., & Schmitt, N. Innovation adoption decisions in organizations: An empirical investigation. In C. H. Blakely (Chair), Adoption, implementation, and routinization of organizational innovations. Symposium conducted at the meeting of the American Psychological Association, Washington, D.C., 1982.

Kegeles, S. S., Lund, A. K., & Weisenberg, M. Acceptance by children of a daily home mouthrinse program. Social Science and Medicine, 1978, 12, 199-210.

Kirigin, K. A., Braukmann, C. J., Atwater, J. D., & Wolf, M. M. An evalu- of Teaching-Family (Achievement Place) group homes for juvenile offenders. Journal of Applied Behavior Analysis, 1982, 15, 1-16.

Liberman, R. P. A review of Paul and Lentz's Psychological (sic) treatment for chronic mental patients: Milieu versus social-training programs. Journal of Applied Behavior Analysis, 1980, 13, 367-371.

Nickel, P. R., & Davidson, W. S., II. Routinization of innovations: Incorporation of innovations into standard practice. In C. H. Blakely (Chair), Adoption, implementation, and routinization of organizational innovations. Symposium conducted at the meeting of the American Psychological Association, Washington, D.C., 1982.

Patton, M. W., Grimes, P. S., Guthrie, K. M., Brennan, N. J., French, B. D., & Blyth, D. A. In search of impact: An analysis of the utilization of federal health evaluation research. In C. H. Weiss (Eds.), Using social research in public policy making. Lexington: Heath, 1977.

Peters, D. L. Social science and social policy and care of young children: Head Start and after. Journal of Applied Developmental Psychology, 1980, 1, 7-27.

Peterson, D. R. Overall synthesis of the Spring Hill Symposium on the Future of Psychology in the Schools. School Psychology Review, 1981, 10, 307-314.

Roessner, J. D. Technological diffusion research and national policy issues. Knowledge: Creation, Diffusion, Utilization, 1980, 2, 179-201.

Salasin, S. E., & Davis, H. R. Facilitating the utilization of evaluation... A rocky road. In I. Davidoff, M. Guttentag, & J. Offutt (Eds.), Evaluating community mental health services: Principles and practices (DHEW Publication No. (ADM)77-465). Rockville, MD: U.S. Department of Health, Education, and Welfare, 1977.

Sherman, J. G. Do the data count? In S. W. Bijou & R. Ruiz (Eds.), Behavior modification: Contributions to education. Hillsdale, NH: Erlbaum, 1981.

Skinner, B. F. Innovation in science teaching. Science, 1981, 212, 283.

Stolz, S. B. Adoption of innovations from applied behavioral research: "Does anybody care?" Journal of Applied Behavior Analysis, 1981, 14, 491-505.

Stolz, S. B. Dissemination of behavioral interventions with women: Needed--A technology. In E. A. Blechman (Ed.), Behavior modification with women. NY: Guilford Press, in press. (a)

Stolz, S. B. Dissemination of standardized human-service models: A behavior analyst's perspective. In S. Paine, T. Bellamy, & B. Wilcox (Eds.), Human services that work: From innovation to standard practice. Baltimore, MD: Paul H. Brookes, in press. (b)

Stolz, S. B. Preventive models: Implications for a technology of practice. In M. C. Roberts and L. Peterson (Eds.), Prevention of problems in childhood: Psychological research and applications. NY: Wiley-Interscience, in press. (c)

Thomas, L. The medusa and the snail. NY: Viking, 1979.

Useem, M., & DiMaggio, P. An example of evaluation research as a cottage industry: The technical quality and impact of arts audience studies. Sociological Methods and Research, 1978, 7, 55-84.

Weiss, C. H., & Bucuvalas, M. J. The challenge of social research to decision making. In C. H. Weiss (Eds.), Using social research in public policy making. Lexington, MA: Heath, 1977.

Footnote

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